



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/899,937	07/09/2001	Koji Shimazawa	033211-013	5939

7590 07/14/2005

Ellen Marcie Emas
BURNS, DOANE, SWECKER & MATHIS, L.L.P.
P.O. Box 1404
Alexandria, VA 22313-1404

EXAMINER

MAGEE, CHRISTOPHER R

ART UNIT	PAPER NUMBER
----------	--------------

2653

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/899,937	Applicant(s) SHIMAZAWA ET AL.	
	Examiner Christopher R. Magee	Art Unit 2653	

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The reply filed 01/04/2005 was applied to the following effect: All relevant drawing objections are withdrawn as being satisfied.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 5, 6, 8, 9 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Sato (US 6,563,678 B2).

- Regarding claims 1, 2, 6, 8, 9 and 11, Sato shows a magnetoresistive effect thin-film magnetic head (Figure 5), comprising:

a lower shield layer 20;

a lower gap layer 21 made of a nonmagnetic electrically conductive material and laminated on said lower shield layer;

a recess 20a in a part of said lower shield layer at a position where said magnetoresistive effect multilayer is to be absent;

a magnetoresistive effect multilayer 23 in which a current flows in a direction perpendicular to surfaces of layers of said magnetoresistive effect multilayer, said magnetoresistive effect multilayer 23 being laminated on said lower gap layer 21;

an upper gap layer 26 made of a nonmagnetic electrically conductive material and laminated on said magnetoresistive effect multilayer;

an insulation gap layer 40 made of an insulation material and formed at least between said lower shield layer and said upper gap layer to surround said lower gap layer and said magnetoresistive effect multilayer (Fig. 5: ABS view);

an upper shield layer 27 laminated on said upper gap layer and said insulation gap layer; and

an additional insulation layer 29 formed so that a distance between said lower shield layer and said upper gap layer increases at a location where said magnetoresistive effect multilayer is absent and located within recess 20a.

- Regarding claim 3, Sato shows an additional insulation layer 29 formed as an under layer of said upper gap layer 26 at a position where said magnetoresistive effect multilayer is absent (Figure 5).

- Regarding claims 5, 8 and 11, Sato discloses the magnetoresistive effect multilayer 23 is a current perpendicular to the plane giant magnetoresistive effect multilayer including a nonmagnetic metal layer, and a pair of ferromagnetic thin-film layers between which said nonmagnetic metal layer is sandwiched (col. 6, lines 33-67).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 4, 7, 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 6,563,678 B2) as applied to claims 1, 6 and 9 above, and further in view of Redon et al. (hereinafter Redon) (US 6,381,107 B1).

- Regarding claims 4, 7 and 10, Sato shows all the features as stated above. However, Sato does not disclose the magnetoresistive effect multilayer being a tunnel magnetoresistive effect multilayer including a tunnel barrier layer and a pair of ferromagnetic thin-film layers between which said tunnel barrier layer is sandwiched.

Redon teaches a magnetoresistive effect multilayer being a tunnel magnetoresistive effect multilayer including a tunnel barrier layer and a pair of ferromagnetic thin-film layers between which said tunnel barrier layer is sandwiched (col. 2, lines 39-45).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the MR element of Sato with a tunnel magnetoresistive effect multilayer as taught by Redon.

The rationale is as follows: One of ordinary skill in the art at the time of the invention would have been motivated to replace the MR element of Sato with a tunnel magnetoresistive effect multilayer as taught by Redon in order to provide the magnetoresistive head with high

Art Unit: 2653

biasing efficiency and to ensure a high, stable head output for adaptation to ultra high density recording (Redon; col. 2, lines 31-36).

4. Claims 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 6,563,678 B2) in view of Fontana et al. (hereinafter Fontana) (US 5,568,535).

- Regarding claim 12, Sato shows a magnetoresistive effect thin-film magnetic head (Figure 5), comprising:

- a lower shield layer 20;

- a lower gap layer 21 made of a nonmagnetic electrically conductive material and laminated on said lower shield layer;

- a recess 20a in a part of said lower shield layer at a position where said magnetoresistive effect multilayer is to be absent;

- a magnetoresistive effect multilayer 23 in which a current flows in a direction perpendicular to surfaces of layers of said magnetoresistive effect multilayer, said magnetoresistive effect multilayer 23 being laminated on said lower gap layer 21;

- an upper gap layer 26 made of a nonmagnetic electrically conductive material and laminated on said magnetoresistive effect multilayer;

- an insulation gap layer 40 made of an insulation material and formed at least between said lower shield layer and said upper gap layer;

- an upper shield layer 27 laminated on said upper gap layer and said insulation gap layer;

and

Art Unit: 2653

an additional insulation layer 29 formed so that a distance between said lower shield layer and said upper gap layer increases at a location where said magnetoresistive effect multilayer is absent and located within recess 20a.

Sato does not teach or suggest a second additional insulation layer on the insulation gap layer at a position where said magnetoresistive effect multilayer is absent.

With that in mind, Fontana teaches forming a second additional insulation layer (i.e., a second insulative gap layer) on a first insulation layer (col. 3, lines 3-14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the MR element of Sato with a second additional insulation layer as taught by Fontana.

The rationale is as follows: One of ordinary skill in the art at the time of the invention would have been motivated to provide the MR element of Sato with a second additional insulation layer as taught by Fontana in order to eliminate a short between the lead layer and the first and second shield layers (Fontana; col. 3, lines 23-25).

- Regarding claim 14, Sato discloses the magnetoresistive effect multilayer 23 is a current perpendicular to the plane giant magnetoresistive effect multilayer including a nonmagnetic metal layer, and a pair of ferromagnetic thin-film layers between which said nonmagnetic metal layer is sandwiched (col. 6, lines 33-67).

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 6,563,678 B2) and Fontana et al. (hereinafter Fontana) (US 5,568,335) as applied to claim 12 above, and further in view of Redon et al. (hereinafter Redon) (US 6,381,107 B1).

Art Unit: 2653

- Regarding claim 13, Sato and Fontana show all the features as stated above. However, Sato and Fontana do not disclose the magnetoresistive effect multilayer being a tunnel magnetoresistive effect multilayer including a tunnel barrier layer and a pair of ferromagnetic thin-film layers between which said tunnel barrier layer is sandwiched.

Redon teaches a magnetoresistive effect multilayer being a tunnel magnetoresistive effect multilayer including a tunnel barrier layer and a pair of ferromagnetic thin-film layers between which said tunnel barrier layer is sandwiched (col. 2, lines 39-45).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the MR element of Sato and Fontana with a tunnel magnetoresistive effect multilayer as taught by Redon.

The rationale is as follows: One of ordinary skill in the art at the time of the invention would have been motivated to replace the MR element of Sato and Fontana with a tunnel magnetoresistive effect multilayer as taught by Redon in order to provide the magnetoresistive head with high biasing efficiency and to ensure a high, stable head output for adaptation to ultra high-density recording (Redon; col. 2, lines 31-36).

Response to Arguments

6. Applicant's arguments filed 01/04/2005 have been fully considered but they are not persuasive.

- First, the Applicant asserts on page 13:

"Thus, Sato merely discloses an insulating layer 40 formed between an electrode layer 25 and an upper shielding layer 27. Nothing in Sato shows, teaches or suggests an insulation layer gap layer, which surrounds a lower gap layer and a magnetoresistive effect multilayer as claimed in claims 1, 6 and 9 (and 12). Rather, Sato merely discloses an insulating layer 40 which is formed between an electrode layer 25 and upper shielding layer 27."

The Examiner contends Figure 5 of *Sato* '678 is an ABS view and insulating layer 40 surrounds the lower gap layer 21 and the magnetoresistive effect multilayer 23 as claimed in the present invention.

Therefore, the rejection of claims 1-11 is maintained.

- Second, the Applicant advocates on page 17:

"Nothing in Fontana shows, teaches or suggests (a) forming an insulation gap layer on a first additional insulation layer which is formed in a recess, (b) forming the insulation gap layer to surround a lower gap layer and a magnetoresistive effect multilayer as claimed in claim 12. Rather, Fontana merely discloses gap layers G1, G1P, G2 and G2P which are provided between lead layers and shield layer S1, S2"

Fontana '335 teaches forming a second additional insulation layer (i.e., a second insulative gap layer) on a first insulation layer (col. 3, lines 3-14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the MR element of *Sato* with a second additional insulation layer as taught by *Fontana*.

The rationale is as follows: One of ordinary skill in the art at the time of the invention would have been motivated to provide the MR element of *Sato* with a second additional insulation layer as taught by *Fontana* in order to eliminate a short between the lead layer and the first and second shield layers (*Fontana*; col. 3, lines 23-25). Therefore, the rejection of claims 12-14 is upheld.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher R. Magee whose telephone number is (571) 272-7592. The examiner can normally be reached on M-F, 8: 00 am-5: 30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on (571) 272-7589. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2653

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Christopher R. Magee
Patent Examiner
Art Unit 2653

July 10, 2005
crm



GEORGE J. LETSCHER
PRIMARY EXAMINER